

sculptured, and readily distinguished by the elongate channel on the thorax. It has evidently, like its European ally, the curious habit of covering itself with grains of sand or earth.

Sapporo, Japan. Taken abundantly in August 1880.

*List of Species.*

Elmomorphus brevicornis, n. sp.	Stenelmis foveicollis, Schönfeldt.
Leptelmis gracilis, n. sp.	Georyssus canalifer, n. sp.

XXXII.—On the African Specimens of the Genus *Scorpio* (Linn.) contained in the Collection of the British Museum.

By R. I. Pocock, Assistant, Nat. Hist. Museum.

It is much to be regretted that there exists amongst arachnologists considerable difference of opinion with respect to the generic nomenclature of those Scorpions (and their allies) which form the subject-matter of the present paper; and it is the desire to see the uniform adoption of certain names that urges me to venture upon a few remarks on the question.

Amongst the species of *Scorpio* described by Linnæus, there are two which at the present moment claim our special attention; these are *Sc. africanus* and *Sc. maurus*. Of these two, the latter was re-named *palmatus* by Ehrenberg, and placed, in conjunction with another species named *spinifer*, in the genus *Heterometrus* of that author.

Now Dr. Thorell, wishing to abolish *Scorpio* as a generic name, substituted *Pandinus* in its place, and kept as the type of *Pandinus* a W.-African Scorpion, which he believed to be the *africanus* of Linnæus. And further, believing *maurus* (Linn.) to be generically distinct from *Pandinus*, he reserved for its reception the genus *Heterometrus*, a name which, as stated above, had been given to it as *palmatus* by Ehrenberg. *Spinifer*, Ehrenberg's second species of *Heterometrus*, Thorell placed in a new genus *Palamnæus*, distinct from both *Heterometrus* and *Pandinus*.

Dr. Karsch, on the other hand, keeps the generic name *Scorpio*, and regards *maurus* (Linn.) as the type of it; and, agreeing with Thorell respecting the generic separation of *maurus*, *africanus*, and *spinifer*, he refers *africanus* to the genus *Pandinus*, and makes *spinifer* the type of *Heterometrus*.

Yet a third view is held by M. E. Simon, who restores for *africanus* the name *Scorpio*, and makes *Pandinus* synonymous

with it; *maurus* he refers to *Heterometrus*, and *spinifer* (I presume) to *Palamnæus*.

The three views may be tabulated as follows:—

Thorell.		Karsch.		Simon.
Heterometrus	=	Scorpio	=	Heterometrus.
Pandinus	=	Pandinus	=	Scorpio.
Palamnæus	=	Heterometrus	=	Palamnæus.

It will be seen from this that Karsch differs from Thorell in two points, and that Simon differs from Thorell in one point, whilst Simon differs from Karsch in all points; and that which makes the matter more complicated still is the fact that each author has plenty to say in support of his own view.

I think, however, that the case can be in a great measure simplified by the adoption of a fourth view, which is to a certain extent a combination of the two held respectively by Dr. Karsch and Mons. Simon.

In the first place, I cannot see that Thorell had adequate grounds for changing *Scorpio* into *Pandinus*, and I do not know that any author, with the exception, perhaps, of Count Keyserling, has followed him in this respect. If, then, it be agreed to restore the name *Scorpio*, it will be seen, I think, that the main difficulty to be contended with arises from the idea that *maurus* is generically distinct from *africanus*.

Now the reason for the separation of the two is found in a difference in the shape of the humerus or second segment of the chela, that segment in *maurus* presenting a form which has not yet been met with in *africanus* and its allies. But the fact that the shape of the humerus is not constant in all the species allied to *africanus* shows that the character is one of no great importance; and further, since *maurus* is the only species which possesses a peculiarly-shaped humerus, the question may well be asked, What is gained by its separation? Obviously, nothing. On the contrary, much of the confusion above pointed out has resulted from it; and if I were to follow on this point the example of my predecessors, consistency would compel me to form new generic names for the species described below as *exitialis* and *cavimanus*. But this I shall not do. I shall content myself with regarding them and *maurus* merely as well-marked species of *Scorpio*, and if this view be followed by other authors the solution of the problem becomes easy; for *spinifer*, the other species of *Heterometrus*, can then stand as the type of that genus, and *Palamnæus* will be a synonym of *Heterometrus*, as *Pandinus* is a synonym of *Scorpio*.

The adoption of the genus *Scorpio* will necessitate the alteration of the family name from Pandinoidæ or Heterometroidæ into Scorpionidæ, or, as Thorell would call it, Scorpionoidæ.

It is unfortunate that there is so much uncertainty respecting the identity of *africanus* (Linn.), the type of the genus *Scorpio*. All the useful information concerning it is that it is an African species, hairy, and possessing twelve or thirteen pectinal teeth; but the conclusions hitherto arrived at on the subject are as different as they are unsatisfactory. Simon supposed it to be the *Buthus cesar* of C. Koch, Thorell the *Ræseli* of Simon, and Becker the *asper* of Thorell. To each of these views, however, exception may be taken. Firstly, *cesar* is an East-Indian species; secondly, *Ræseli* has sixteen pectinal teeth; thirdly, *asper* is probably synonymous with *Swammerdami*, which is also an Indian species. I am inclined to think that the species that I have named below *dictator* may be the unknown *africanus* of Linnæus. At all events the description of Linnæus, so far as it goes, applies to this species, as I believe it applies to no other, and I have consequently regarded *dictator* as questionably synonymous with *africanus*.

*Scorpio cavimanus*, sp. n.

*Cephalothorax*.—Anterior margin with a median semicircular excision; margin of the excision and of the frontal lobes piliferous and dentate; the posterior deeper portion of the median longitudinal sulcus bounded on each side by a low, finely granular prominence; the frontal lobes, the slightly depressed area immediately in front of the ocular tubercle, and the lateral and postero-lateral regions of the cephalothorax finely granular; the rest smooth; the central eyes nearer to the semicircular excision than to the hind margin of the cephalothorax; median eye of lateral series nearer to the anterior than to the posterior eye of the same series.

*Tergites* granular, more coarsely so anteriorly than posteriorly; each marked with two abbreviated sulci in front, and with an obsolete crest behind; posterior tergite bearing a conspicuous median finely granular prominence; the granules upon this tergite more coarse, and showing laterally a tendency to arrangement in definite series.

*Sternites* perfectly smooth, furnished with the usual sulci, the last bearing posteriorly four very faint keels.

*Tail*.—Inferior keels of two proximal segments quite smooth; inferior keels of third segment and the spaces be-

tween these keels slightly granular posteriorly; inferior keels and inferior intercarinal spaces of the fourth and fifth segments granular; superior keels and the superior intercarinal spaces granular, the latter more so before than behind; the lateral intercarinal space also granular; vesicle furnished with series of granules beneath, smooth above; aculeus somewhat sharply curved at the apex.

*Chela*.—Humerus with somewhat convex upper surface, which is furnished in front and proximally with a few larger and smaller granules, and bounded in front and behind by a row of denticles; anterior margin smooth, bounded above by an oblique series, and below by a straight series of denticles; inferior surface smooth; posterior surface smooth, but for two or three granules near its upper margin; brachium almost smooth, slightly roughened above and behind, finely granular in front above, and finely denticulate in front below, furnished below and behind with two irregular series of setiferous punctures. Hand remarkably wide; convex from side to side proximally, but conspicuously concave at the base of the immovable finger; its anterior margin evenly rounded and smooth, neither granular nor denticulate; superior surface granular posteriorly, slightly roughened in the concavity, the rest smooth and sparsely punctured; inferior surface sparsely granular distally; immovable finger remarkably wide at the base (*cf.* measurements of this and other species). Fingers hairy.

Femora of legs anteriorly finely granular, roughened beneath. Legs hairy.

*Pectines* projecting beyond the margin of the posterior coxæ. Number of teeth 15.

*Colour* piceo-castaneous; hands castaneous, fingers very dark green; legs and under surface ochraceous.

*Measurements in millimetres.*

	Length.	Breadth.	Height.
Total .....	100		
Cephalothorax .....	16 $\frac{1}{2}$	18 $\frac{1}{2}$	
First caudal segment ....	7 $\frac{3}{4}$	7	5 $\frac{1}{2}$
Fifth caudal segment ....	11	5	4 $\frac{1}{4}$
Tail .....	52 $\frac{1}{3}$		
Vesicle .....	6 $\frac{1}{2}$	5 $\frac{1}{2}$	4 $\frac{1}{4}$
Aculeus .....	3 $\frac{1}{2}$		
Humerus .....	11 $\frac{1}{3}$		
Brachium .....	13		
Hand .....	17	17 $\frac{1}{4}$	7
Back of hand .....	9 $\frac{1}{2}$		
Movable finger .....	18		
Immovable finger .....	12	7 $\frac{1}{4}$ (at base)	
Pecten .....	9		
Pectinal tooth .....	2 $\frac{1}{2}$		

Tail rather more than three times as long as cephalothorax.

Cephalothorax equalling in length the 1st + the 2nd +  $\frac{1}{3}$  of the 3rd caudal segments.

This species may be at once distinguished by the width of the head and by the remarkable depression it bears upon its upper surface. I have seen two specimens of it—one (dried) brought from Kilima-Njaro by Mr. M. J. Jackson; the other, which, being preserved in spirit of wine, I have selected as the type, brought by Capt. Speke from Umyamuezi. Both appear to be males. The specimen from Kilima-Njaro is smaller and slightly less granular than the other.

*Scorpio exitialis*, sp. n.

*Cephalothorax*.—Anterior margin circularly excised in the middle line; marked throughout its length with a shallow median sulcus, which deepens and terminates immediately in front of the hind margin; laterally this deeper portion is bounded by a smooth flat area corresponding with the usually rounded elevations of other species; ocular tubercle conspicuous, deeply cleft, and not continued before and behind into distinct ridges; anterior portion of cephalothorax nearly smooth; a smooth area extending from this anterior portion along the upper surface on each side of the ocular tubercle almost to the above-mentioned smooth flat area; in the immediate neighbourhood of the ocular tubercle behind and at the sides are a few granules, in front of the tubercle the cephalothorax is sparsely granular for some distance; laterally the cephalothorax is conspicuously though somewhat sparsely granular, the granules appearing to be smaller and closer set posteriorly; central eyes a little nearer to the posterior margin of the cephalothorax than to the circular excision; the central eye of the lateral series nearer to the anterior than to the posterior eye of the same series.

*Tergites* posteriorly and laterally beset with fine granules, anteriorly smooth; with very faint indications of a median elevation and of an anterior right and left abbreviated sulcus; upper portion of last tergite smooth, with an anterior median elevation and a posterior depression, bounded on each side by a coarsely granular ridge, beneath which are smaller anterior and larger posterior granules.

*Sternites* perfectly smooth, sparsely punctured, each furnished in front with a right and left abbreviated sulcus; the posterior tergite furnished behind with very faint traces of four smooth keels.



*Tail* slender. Inferior surface of the three proximal segments smooth, with conspicuous keels; inferior surface of the fourth segment furnished behind with a few small denticles, smooth in front; inferior keels and posterior inferior margin of the fifth strongly denticulated, the posterior inferior margin bearing six larger denticles, two upon each lateral angle and two in the middle line. The inferior-lateral intercarinal spaces with a few small denticles. The superior and superolateral keels denticulate, the distal more strongly so than the proximal. The upper surface of the segments depressed in the middle line and smooth; in the fifth segment the denticles of the superior keels spread to a slight extent upon the upper surface of the segment and considerably upon the superior lateral intercarinal space. Vesicle remarkably large, wider than any of the caudal segments, smooth above and at the sides, granular beneath; aculeus equal to about half the length of the vesicle, with its distal half bent almost at right angles to its proximal half.

*Chela*.—Superior surface of humerus furnished with more or fewer larger and smaller tubercles, which, on the proximal portion of the segment, blend with those of the anterior surface; distal portion of anterior surface smooth, proximal portion furnished with an oblique row of tubercles; inferior surface proximally tubercular, distally smooth; posterior surface smooth but for the presence of a single series of setiferous punctures. Superior surface of brachium furnished with two uneven setiferous keels; anterior surface finely granular, bearing below proximally a few tubercles, and separated from the inferior surface by a row of tubercles; inferior surface flat, smooth, bearing behind three irregular series of setiferous pores. Hand much resembling in shape that of *Sc. Raseli*, but less convex above; its upper surface covered with many close-set rounded tubercles, which, especially near the posterior surface, show a tendency to fuse together and to constitute ridges; inferior surface of the hand sparsely tubercular distally, and bearing two distinct rows of tubercles in its proximal half. The segments of the palp and of the legs bear longish hairs; anterior surface of the femora of the second, third, and fourth pairs of legs slightly granular.

*Pectines* absent.

*Colour* blackish or piceous above, paler beneath; legs testaceous.

#### *Measurements in millimetres.*

Tail nearly four times as long as cephalothorax.

Cephalothorax about equal in length to the first two caudal segments.

	Length.	Width.	Height.
Total.....	125		
Cephalothorax.....	17	18	
Tail.....	66 $\frac{1}{2}$		
First caudal segment....	8 $\frac{1}{2}$	7	5
Fifth „ „.....	15	5	5
Vesicle.....	9	7 $\frac{1}{2}$	7
Aculeus.....	5 $\frac{1}{2}$		
Humerus.....	11 $\frac{1}{2}$		
Brachium.....	13 $\frac{1}{2}$		
Hand.....	17 $\frac{1}{2}$	16	7 $\frac{1}{2}$
Back of hand.....	10 $\frac{1}{2}$		
Movable finger.....	17 $\frac{1}{2}$		
Immovable „.....	12 $\frac{1}{2}$		

A single specimen (dried), from Shoa in Abyssinia.

Owing to the unfortunate destruction of the pectines I am unable to describe the characters presented by these organs, and in addition cannot tell the sex of the specimen. It, however, is a very distinct form, differing from all other individuals of the genus known to me in the remarkable size of the poison-vesicle. It is mainly, though by no means entirely, on the strength of this characteristic that I have ventured to give a new name to it.

*Scorpio maurus*, Linnæus.

*Scorpio maurus*, Linn. Syst. Nat. p. 1037.

*Heterometrus palmatus*, Ehrenb. Symb. Phys. (Scorpiones, pl. i. fig. 4.)

Although possessing a number of specimens of this species from Arabia and Syria, the British Museum has only three from Africa. These are from Tunis.

*Scorpio dictator*, sp. n.

Syn.? *Scorpio africanus*, Linn. Mus. Adolphi Friderici, p. 84.

*Cephalothorax*.—Anterior margin semicircularly excised in the middle line; marked throughout its length by a median longitudinal sulcus, which deepens and terminates near the hind margin; on each side this deeper portion is bounded by a rounded prominence; cephalothorax everywhere beset with coarse granules. Central eyes equally distant from the posterior margin of the cephalothorax and from the apex of the anterior excision. Central eye of lateral series slightly nearer to the anterior than to the posterior eye of the same series.

Anterior half of each *tergite* smooth, posterior half coarsely granular; each furnished in the middle with two short sulci

in front and with an obsolete crest behind; the last bearing in its posterior half a sparsely granular prominence, behind which is a smooth depression; the lateral portion furnished behind with two indistinct series of granules above, smooth below, granular in front; the lateral portion separated from the superior portion by a distinct row of fine denticles.

*Sternites* perfectly smooth; all, except the last, marked with an abbreviated sulcus on each side in front.

*Tail*.—Inferior surface of the three proximal segments smooth beneath, with very feebly developed keels; the infero-lateral keels of the third segment posteriorly showing faint indications of denticulations; inferior keels of the fourth distinctly denticulated, those of the fifth strongly denticulated; superior keels of all the segments denticulated, the denticles being stronger upon the posterior than upon the anterior segments; all the intercarinal spaces almost entirely smooth; vesicle smooth above, furnished below and at the sides with finer and coarser denticulations; aculeus gently curved.

*Chela*.—Upper surface of humerus bounded behind and in front with a row of strong denticles, and bearing others scattered, larger and smaller, for the most part on its proximal two thirds; anterior surface bounded below by a straight row of denticles and above by an oblique series; inferior surface smooth, bounded behind for a third of its length by a row of small blunt denticles; posterior surface smooth, bearing a single longitudinal series of setiferous tubercles. Upper surface of brachium bearing a single row of small denticles, posterior surface bearing two roughened keels; inferior surface smooth, with two rows of setiferous punctures near the hind margin; inferior surface separated from the anterior surface by a few conspicuous denticles; anterior surface finely granular. Upper surface of the hand convex, as in *Ræseli*, and with anterior margin similarly rounded, covered with a reticulated pattern composed of smooth irregular ridges, which result from the confluence of rounded tubercles; these ridges may assume a definite longitudinal arrangement, which imparts to the hand a subcostate appearance; anterior (inner) margin of the hand denticulated; inferior surface proximally smooth, distally sparsely denticulated, the denticles not arranged in definite series. Fingers granular above and below, all the segments of the palp sparsely pilose.

Upper and lower surfaces of the femora of the legs somewhat coarsely granular; anterior surface, those of the first pair excepted, finely granular.

*Pectines* not projecting so far as the distal margin of the posterior coxæ; number of teeth thirteen.



*Colour*.—Very dark green or black above, with a reddish tint; brownish beneath.

*Measurements in millimetres.*

Tail four times as long as cephalothorax.

Cephalothorax slightly shorter than the first two caudal segments.

	Length.	Breadth.	Height.
Total .....	166 (about $6\frac{1}{2}$ English inches)		
Cephalothorax.....	$22\frac{1}{2}$	25	
Tail, total .....	90		
First caudal segment .....	$10\frac{1}{2}$	$9\frac{1}{4}$	8
Fifth „ „ .....	19	$7\frac{1}{3}$	7
Vesicle .....	11	$8\frac{1}{2}$	7
Aculeus .....	8		
Humerus .....	15		
Brachium .....	17		
Hand .....	$23\frac{1}{2}$	$21\frac{1}{4}$	10
Back of hand .....	$1\frac{1}{4}$		
Movable finger .....	23		
Immovable finger .....	$16\frac{1}{2}$	(at base) $7\frac{1}{2}$	
Pecten .....	$8\frac{1}{4}$		
Pectinal tooth .....	$2\frac{1}{4}$		

This scorpion rivals in size *imperator* and *Ræseli*, and to both of them it bears considerable resemblance. It may, however, be generally distinguished from both by the greater coarseness of its granules and by the smaller number of pectinal teeth; and particularly from *imperator* by the position of the central lateral eye, and from *Ræseli* by the fact that the upper surface of the cephalothorax is furnished behind, on each side of the middle line, with a conspicuous granular prominence, the same area in *Ræseli*—at least in the series of that species that I have seen—being depressed and nearly always smooth; further, the caudal intercarinal spaces are smooth and the tubercles of the hand less pronounced and more fused.

The British Museum possesses two female specimens, one from Fernando Po, presented by Capt. Birch, the other labelled W. Africa from the collection of Mr. Dalton.

*Scorpio Ræseli* (Simon).

1871. *Heterometrus Ræseli*, E. Simon, Rev. Mag. Zool. xxiii. p. 54, pl. vi. fig. 4.

1877. *Pandinus africanus* (Linn.), Thorell, Etudes Scorpiol. p. 128.

1880. *Scorpio Ræseli* (Simon), L. Becker, Ann. Soc. Ent. Belg. xxiv. p. 138, pl. ii. fig. 2.

This appears to be the commonest, as it is the finest, West-

African species. The Museum possesses nine specimens, five males and four females—one from Fernando Po, one from Onitsha, one from Gambia, two from Fantee, one from the Gold Coast, the rest labelled West Africa. The largest specimen (female) measures 182 millim. from the margin of the cephalothorax to the end of the tail. The number of pectinal teeth varies from fifteen to eighteen, but is usually sixteen; the hairs upon the chelæ and legs vary much in number and length. The granules also vary considerably in coarseness and distribution.

*Scorpio imperator* (C. Koch).

1842. *Buthus imperator*, C. Koch, Die Arachniden, ix. p. 1, fig. 695.

1877. *Pandinus imperator* (C. Koch), Thorell, *loc. cit.* p. 130.

1880. *Scorpio imperator* (C. Koch), L. Becker, *loc. cit.* p. 138, pl. ii. fig. 2.

Writing in 1880 Mons. L. Becker says:—"On ne connaît, je crois, que trois exemplaires de cette espèce: (1) le type de C. Koch appartenant au Musée de Berlin; (2) un exemplaire faisant partie de la collection de M. Simou; (3) un individu que j'ai pu acquérir, appartenant actuellement au Musée de Bruxelles." To this list I can add one more, belonging to the British Museum. It is a male from West Africa, obtained by Captain Birch, R.N. It has four distinct ocelli upon the left side, the supplementary ocellus being developed in front, as if to make up for the backward position of the central lateral ocellus, a feature which is so characteristic of this species.

*Synoptical Table of Species.*

- a. Upper surface of hand conspicuously concave towards the base of the immovable finger; anterior margin of hand smooth; width of hand greater than length of cephalothorax . . . . . *cavimanus*, sp. n.
- b. Upper surface of hand not distally concave; anterior margin granular or denticulate; width of hand not greater than length of cephalothorax.
  - a<sup>1</sup>. Width of first caudal segment less than the width of the vesicle and equal to the height of it. . . . . *exitialis*, sp. n.
  - b<sup>1</sup>. Width of first caudal segment greater than width of vesicle and still greater than the height of it.
    - a<sup>2</sup>. Humerus somewhat rounded off in front; its anterior surface not separated by a strong ridge from the upper and under surfaces . . . . . *maurus*, Linn.

- b*<sup>2</sup>. Humerus less rounded off in front; its anterior surface separated by a conspicuous ridge from the upper and under surfaces.
- a*<sup>3</sup>. Central eye of the lateral series nearer to the posterior than to the anterior eye of the same series; tergites very finely granular; pectinal teeth 16-18. . . . . *imperator* (C. Koch).
- b*<sup>3</sup>. Central eye of the lateral series not nearer to the posterior than to the anterior eye of the same series.
- a*<sup>4</sup>. Pectinal teeth 16; granules finer; caudal keels less coarsely denticulate; intercarinal spaces granular; cephalothorax furnished behind with a triangularly depressed area . . . . . *Raxeli* (Simon).
- b*<sup>4</sup>. Pectinal teeth 13; granules coarser; caudal keels more strongly denticulate; intercarinal spaces smooth; cephalothorax furnished behind with two conspicuous granular prominences . . . . . *dictator*, sp. n.

The following African species are known to me only from descriptions and figures:—

*Scorpio bellicosus*, L. Koch, *Ägyptische und Abyssinische Arachniden*, Nürnberg, 1875, p. 1, pl. i. fig. 1. From Cairo.

*Scorpio meidensis*, F. Karsch, *Mitth. Münchn. ent. Ver.* 1878, p. 127. From Somali Land.

*Scorpio setosus*, C. Koch, *Die Arachn.* viii. p. 87, fig. 657; redescribed by Karsch, *Abh. nat. Ver. Bremen*, ix. p. 67 (1884). From West Africa.

For a synoptical table of many species of *Scorpio*, including the three just mentioned, see Karsch, *l. c.* p. 68.

*Note*.—In taking the breadth of the cephalothorax, to avoid error owing to possible shrinking in dried specimens, I have measured from the middle line to the lateral margin, and arrived at the total width by doubling the amount so obtained. In the case of the caudal segments I have measured along the supero-lateral keels, and in the case of the palp measurement has been taken along the greatest length of each segment.

The palpi have been described as if projecting at right angles to the long axis of the body.